SPARTAN SCOUT ACTD

Unmanned Surface Vehicle (USV)
For Assured Access and Force Protection

Presented To

JLOTS/Logistics-From-the-Sea

R&D Symposium III
27-29 January 2004

Presented by Mr. Pat Holder

Deployment Process Modernization Office (DPMO) for:

DR. VIC RICCI

SPARTAN Technical Manager

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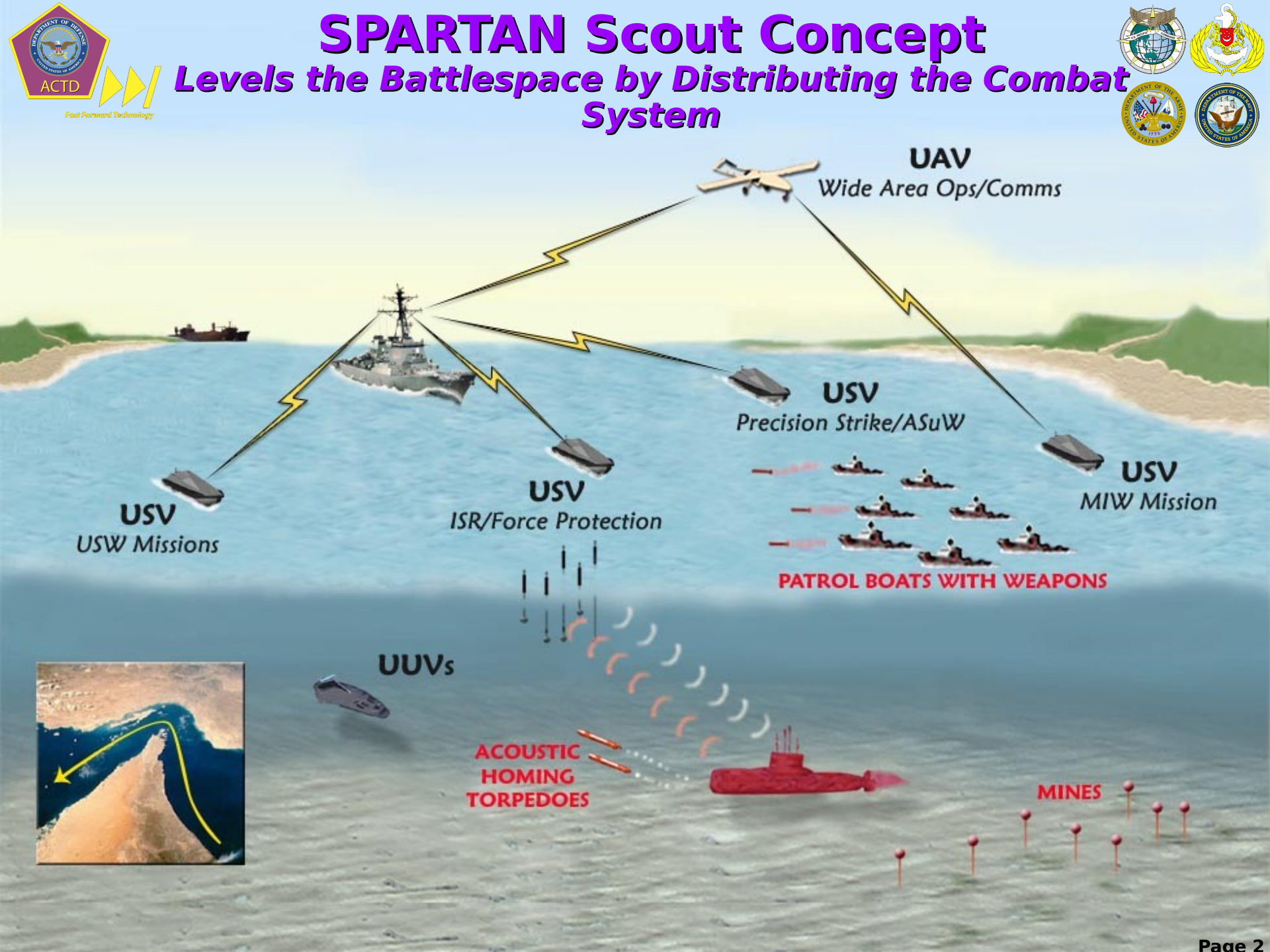
NAVAL UNDERSEA WARFARE CENTER DIVISION, NEWPORT, RI

SPARTAN Scout Concept

Levels the Battlespace by Distributing the Combat System



SPARTAN SCOUT ACTD Objective

- **OBJECTIVE of this ACTD: Demonstrate the Military Utility of USVs for Assured Access and Force Protection in the Littorals and fill a void in capability that the fleet is in critical need of today**
  - Interoperable with joint and coalition forces
  - Conduct critical missions (FP/ISR, Precision Strike, MIW)
  - Prepare the waterspace for Amphibious and Sealift Ops
  - Minimize or eliminate unnecessary risk to personnel and capital assets
  - Provide port-protection when launched/operated from shore
  - Demonstrate USVs as a Force Leveler/Multiplier
- **SPARTAN ACTD on a spiral development process**
  - All developmental efforts for SPARTAN 7m USV are directly applicable to an 11m RHIB
  - Directly applicable to LCS warfighting capability

SPARTAN SCOUT
Participants

OPERATIONAL

- **COCOM/User Sponsor:** PACOM
- **Operational Manager (OM):** 3rd Fleet
- **Users:** 3rd Fleet, Army (Watercraft Units), RSN

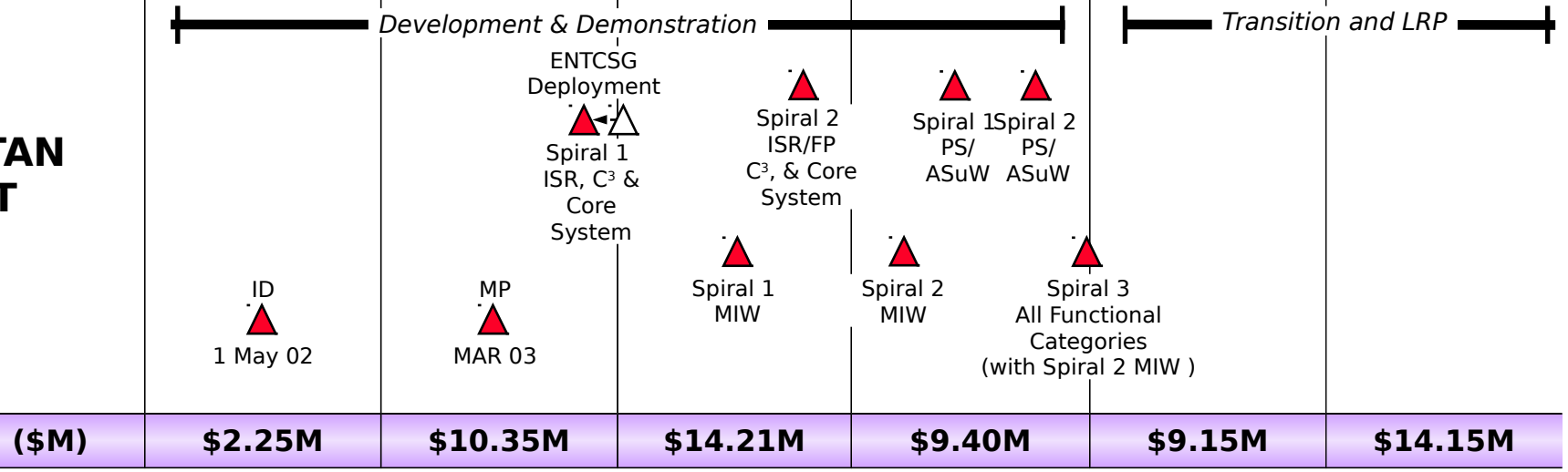
SPONSORS

- Navy (OPNAV N76), Army (AMRDEC/DPMO), Republic of Singapore, DUSD (AS&C)
- Transition Manager: PEO-Ships (PMS 501) / PEO-LMW / Army (TBD)

TECHNICAL

- **Navy:** NAVSEA: NUWC (TM); NSWC (Carderock, Crane, Dahlgren, Panama City), SPAWAR SC (San Diego, Charleston)
- **Army:** AMRDEC, TARDEC, TRADOC
- **Singapore:** DSTA
- **Industry:** Raytheon, Northrop Grumman, IMPI

SPARTAN ACTD Spiral Developments



FUNCTIONAL CATEGORIES	SPIRAL 1	SPIRAL 2	SPIRAL 3
Core System	Core subsystems integrated into modified 7m RHIB test bed	Core subsystems on modularized 7m RHIB	Optimized core system with modular payload capability
Command, Control and Communication (C^3)	Remote control for single vehicle	Semi-autonomous, remote single vehicle control with obstacle avoidance	BLOS, Multi-vehicle, semi-autonomous control
MIW Module	AN/AQS-14 Side Scan Sonar	AN/AQS-24 Mine-hunting Sonar	AN/AQS-24 (from Spiral 2)
ISR/FP Module	ISR capability only	ISR/FP capability (with weapon certification)	IROSSS Gun vs moving target (ASuW)
PS/ASuW Module	Hellfire/Javelin Missile vs Stationary Target Sea State: 0 -1	Hellfire/Javelin Missile vs Moving Target Sea State: 1 - 2	Hellfire/Javelin Missile vs Moving Target at sea State: 2 - 3 (ASuW)

SPARTAN SCOUT

Plug 'n Play Modularity Increases Capability

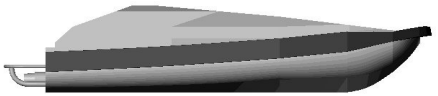
USV Core System + { **ISR-FP Module**; **Precision Strike/ ASuW Module**; **MIW Module** } = { **Assured Access**; **Force Protection**; **Expanded Battlespace Dominance**; **Enhanced Net-centric Capability** }

CORE SYSTEM

+

RECONFIGURABLE "PLUG 'N PLAY" MISSION MODULE

=



WARFIGHTING CAPABILITY

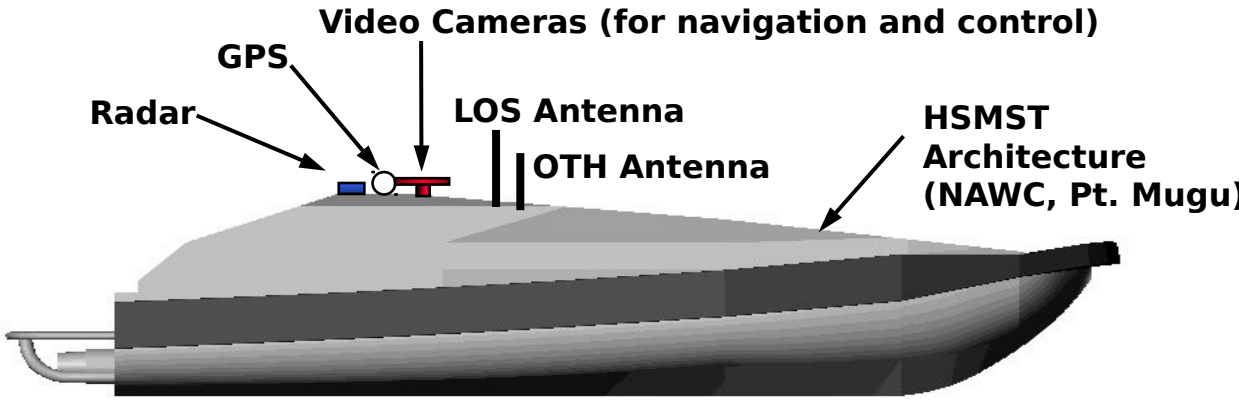
MODULAR PLATFORM ENABLES ADAPTABILITY TO MEET NUMEROUS WARFIGHTING NEEDS WITH ONE CORE SYSTEM

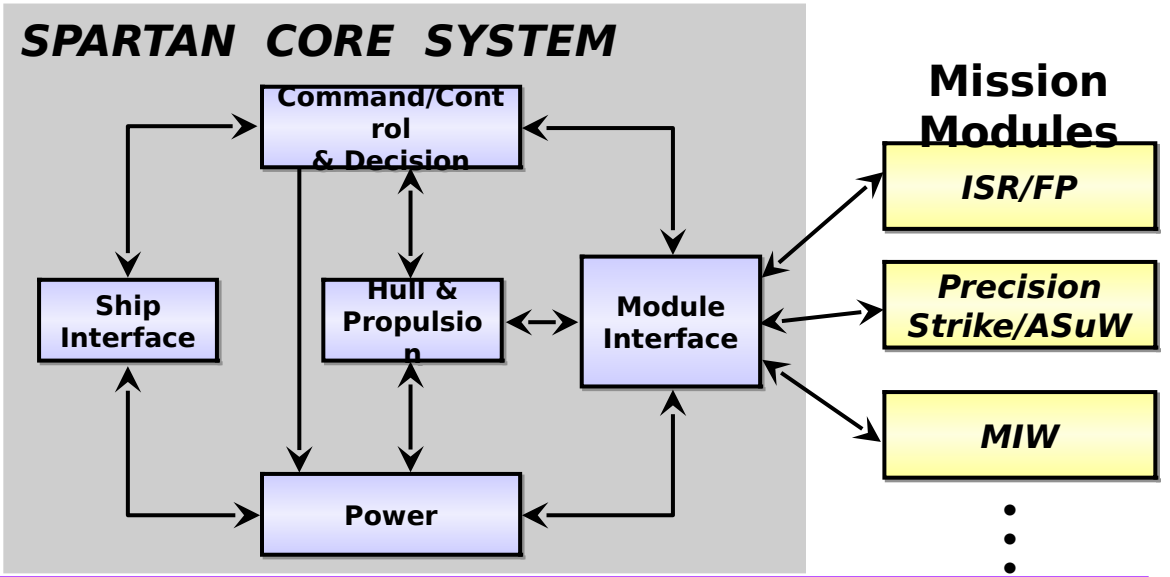
SPARTAN SCOUT
Core System

DESIGN GOALS

- Communications link independent
- Common mission module interface
- Off-the-shelf components
- Distributed architecture
- Open source software
- Minimize effort to exchange Mission Modules
- Ensure interoperability in joint and coalition environment

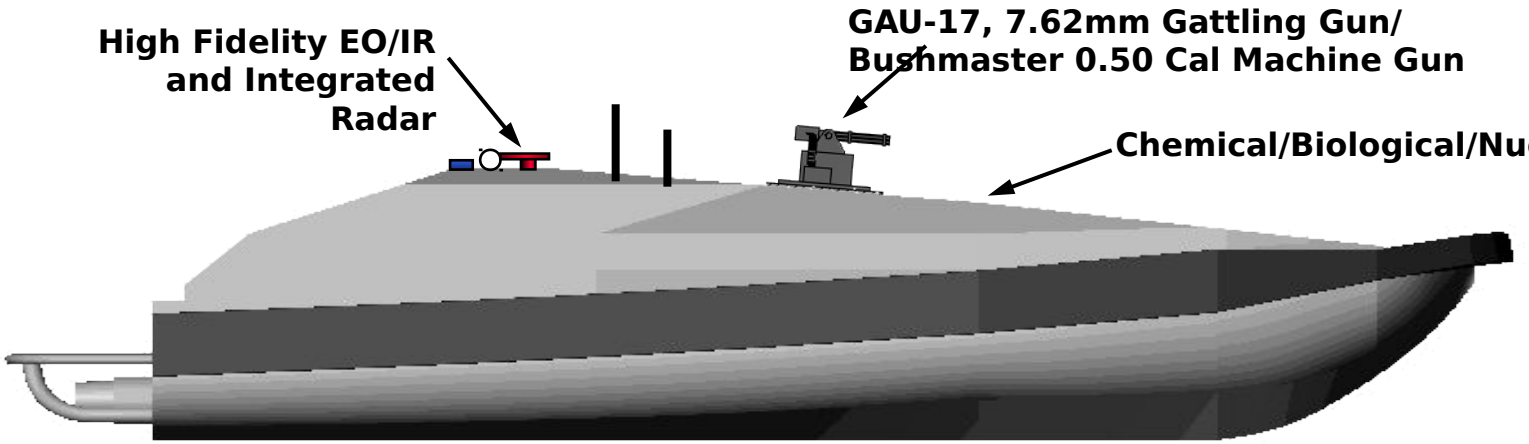
Standard RHIB & Davit

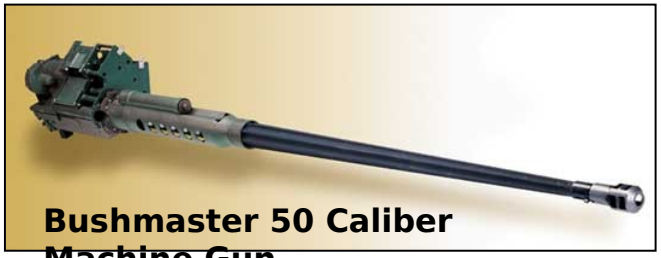


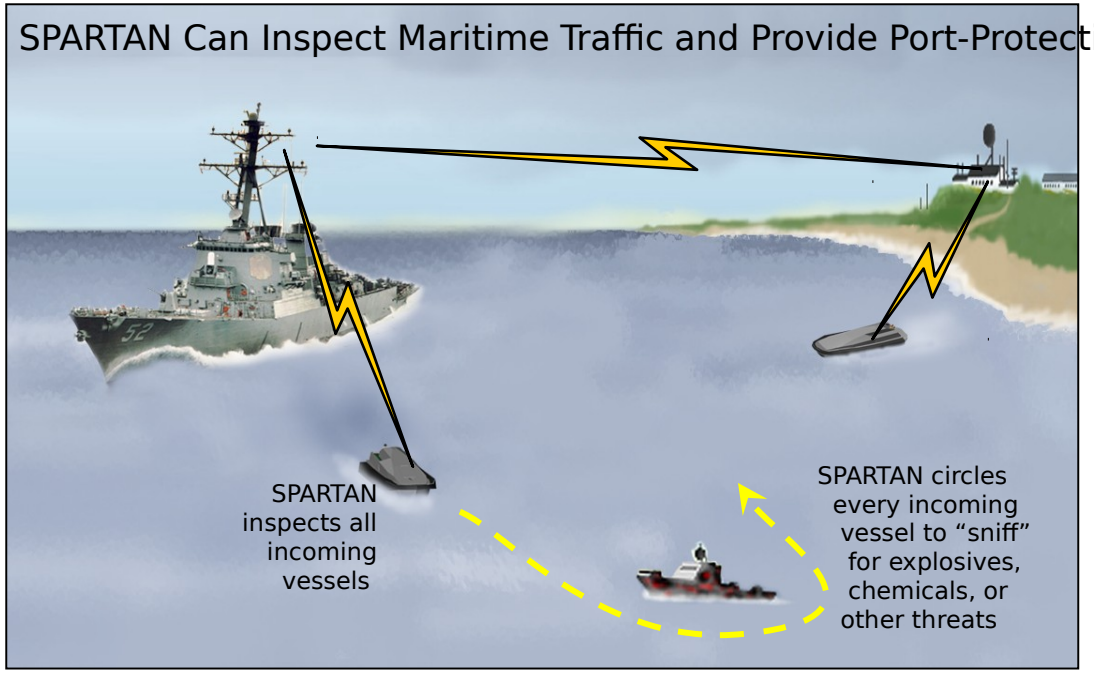


USE EXISTING LOGISTICS - INTEGRATED FIELDED SYSTEMS

SPARTAN SCOUT
ISR-FP Module Concepts


High Fidelity EO/IR and Integrated Radar
GAU-17, 7.62mm Gattling Gun/ Bushmaster 0.50 Cal Machine Gun
Chemical/Biological/Nuclear Detector

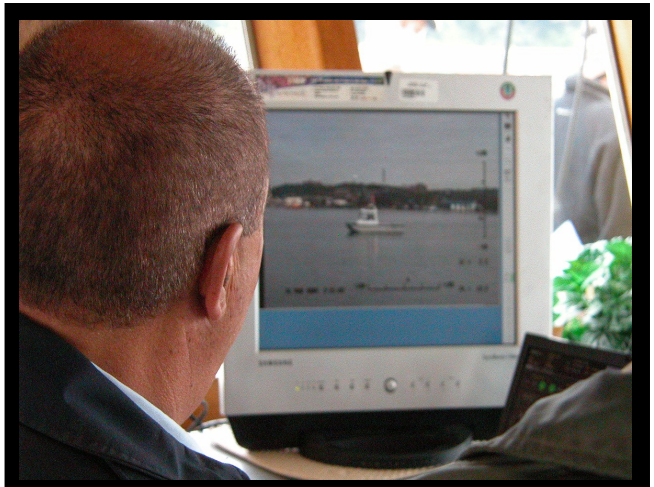



SPARTAN Can Inspect Maritime Traffic and Provide Port-Protection
SPARTAN inspects all incoming vessels
SPARTAN circles every incoming vessel to "sniff" for explosives, chemicals, or other threats

SPARTAN USV Mission Modules
FY03 *Demonstrations*

ENTCSG ISR Demo (May-Jul 03)

CMWC MIW Demo (Oct 03)



SUBASE Groton
Escort Demo (Sep 03)

SPARTAN SCOUT

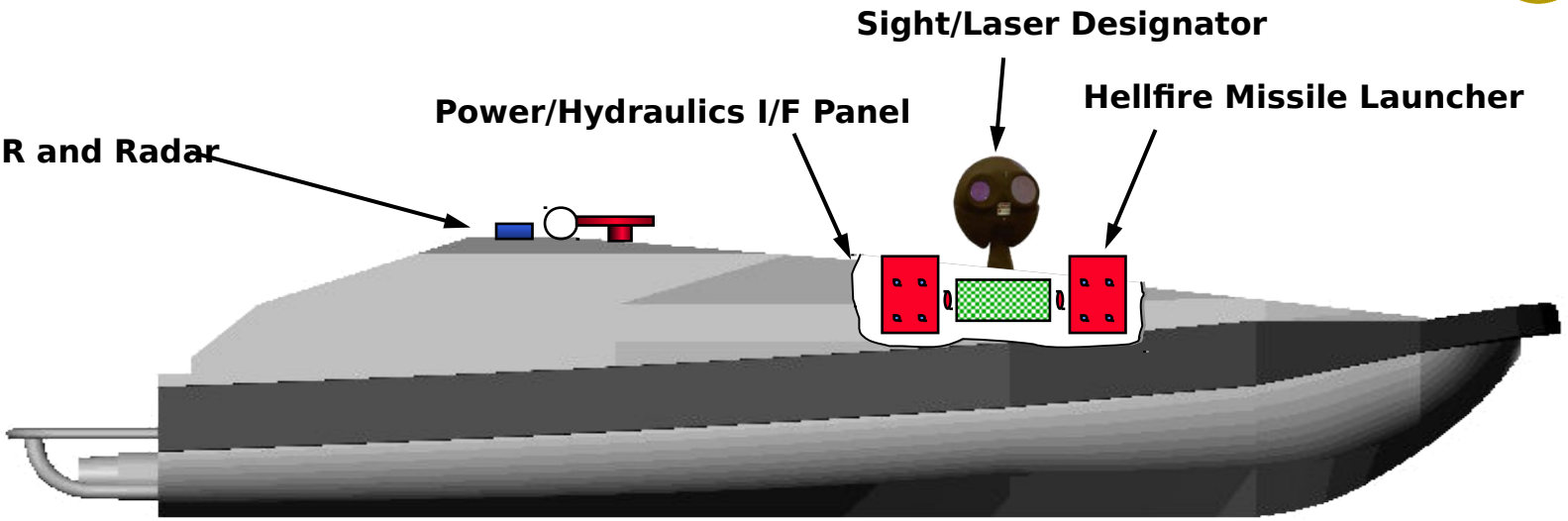
ISR/FP Mechanical Prototype (Dec 02)

SPARTAN SCOUT

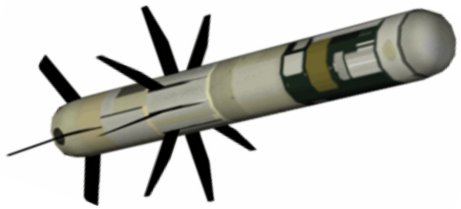
Integrated ISR Prototype for ENTCSG (Jul 03)

SPARTAN SCOUT

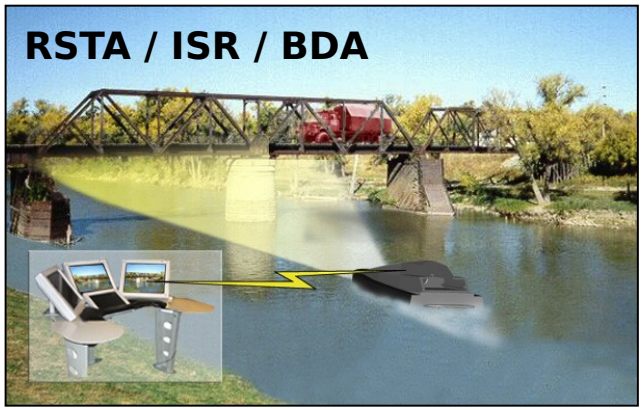
ASuW (Precision Strike) Module Concept

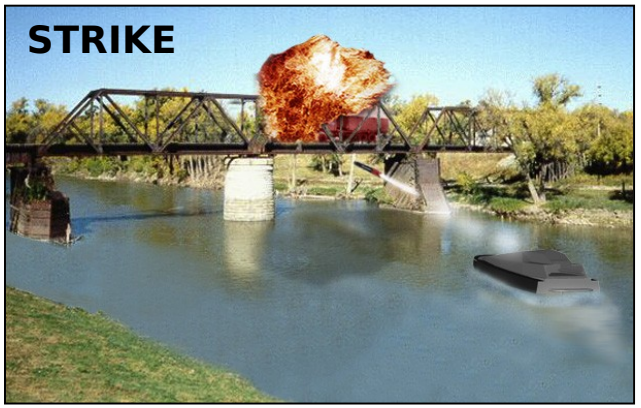


Hellfire Missile



Javelin Missile

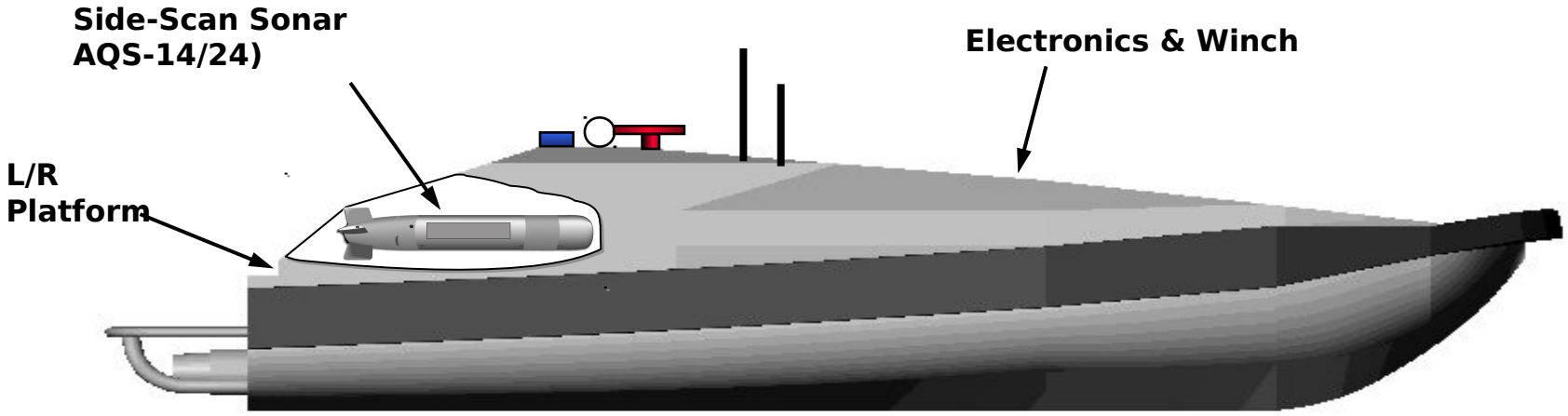


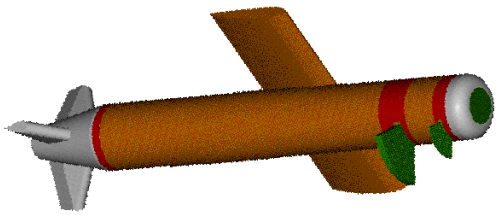


SPARTAN PROVIDES AN INTEGRATED SENSOR AND WEAPON SYSTEM

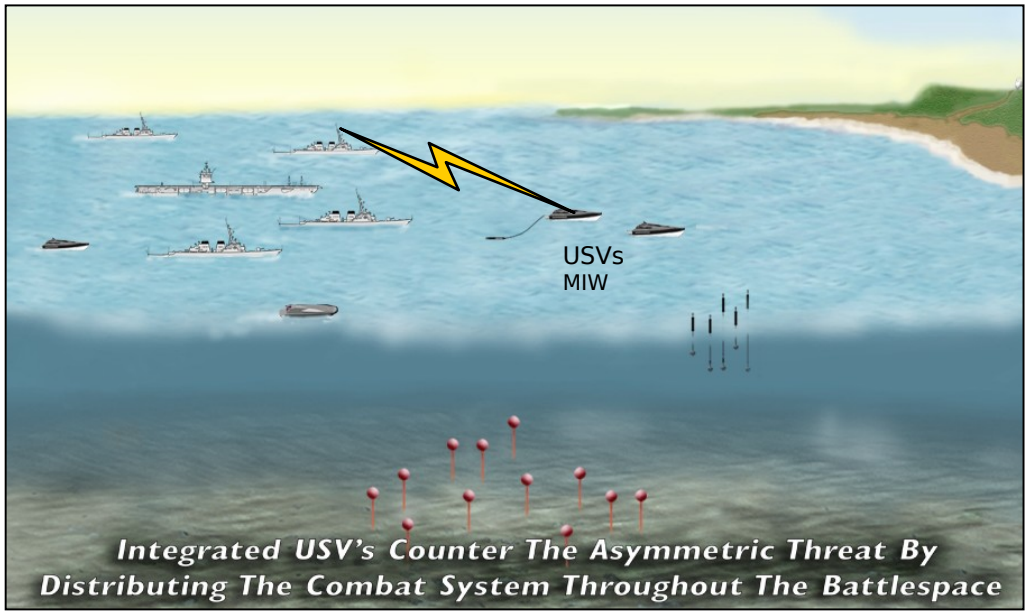
SPARTAN ACTD Program Chooses Konesburg RWS-J Mount

SPARTAN SCOUT
MIW Module Concept





AQS-14/24
High-Resolution Minehunting Sonars


USVs
MIW
Integrated USV's Counter The Asymmetric Threat By
Distributing The Combat System Throughout The Battlespace

SPARTAN SCOUT
11-meter MIW Prototype (Sept/Oct 03)

Northrop Grumman AQS-24 High-Resolution Minehunting Sonar with automated Deploy and Retrieval (D&R) System

NAVSEA NEWPORT Undersea Warfare Center Division

NORTHROP GRUMMAN

SPARTAN Command and Control

CY01	CY02	CY03	CY04	CY05	CY06	CY07

- **Pt. Mugu Remote Operating System**
- **Commercial Navigation System (Nobeltec)**

JAUS →

Joint Common Unmanned Vehicle Operating System

**Joint Architecture for Unmanned Systems: Evolved from Army's unmanned vehicle control system*

ENTERING ARGUMENT

- Navy has not chosen a common operating system. Likely candidate:
  - *Joint Unmanned Systems Common Control (JUSCC) FY04 ACTD by NSWC (CSS).*
- Future Navy ships will carry multiple, interoperable unmanned vehicles to be controlled from a single workstation.

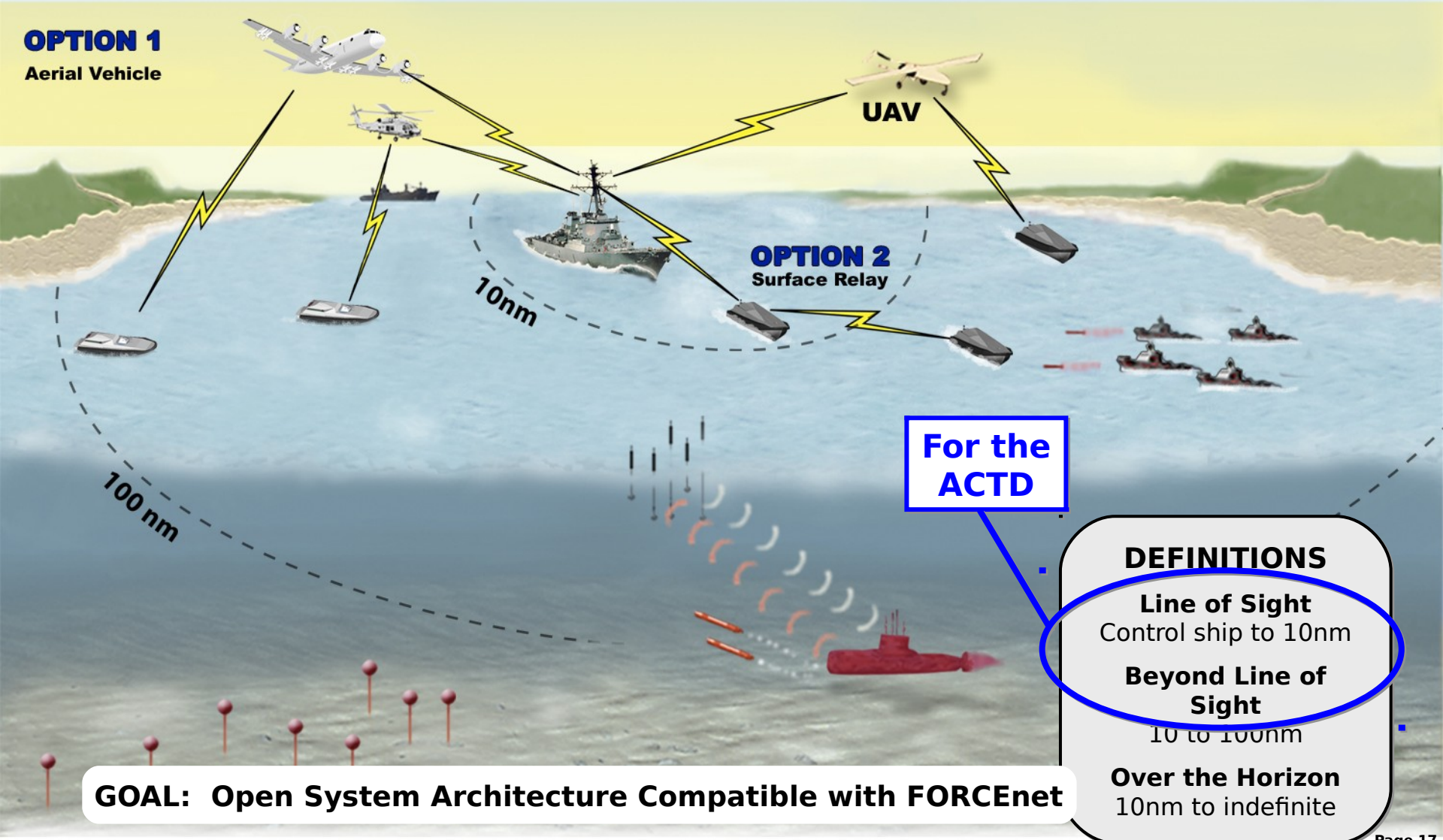
- *Reliable, affordable, (preferably) open architecture system so that we can easily transition to a Joint Common Operating System.*
- *Interoperable with Singapore.*
- *Interoperable with Army.*

POINT MUGU → **COMMERCIAL** → **JAUS**

- GOTS system with primitive functionality for proof of concept.
- Low cost, robust, functional, easy-to-use navigation system for ENTCSG deployment.
- Not open for mitigation package and information distribution development.
- SPARTAN Team conducted a C2 trade study to meet ACTD needs.
- Initial product delivery in early CY04. Can be Test Bed for JUSC2 ACTD.

How SPARTAN will accomplish beyond Line-Of-Sight communications

OPTION 3
Satellite
Limited C^3



For the ACTD

DEFINITIONS

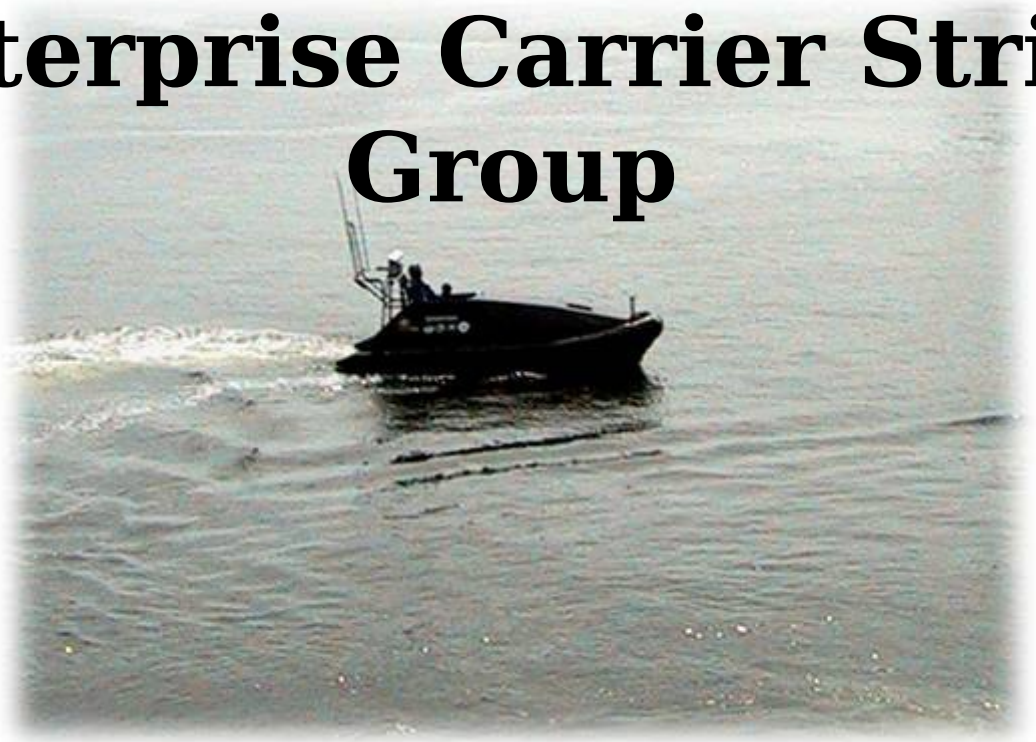
Line of Sight
Control ship to 10nm

Beyond Line of Sight
10 to 100nm

Over the Horizon
10nm to indefinite

GOAL: Open System Architecture Compatible with FORCEnet

SPARTAN SCOUT Rapid Prototype Development and Demonstration with Enterprise Carrier Strike Group

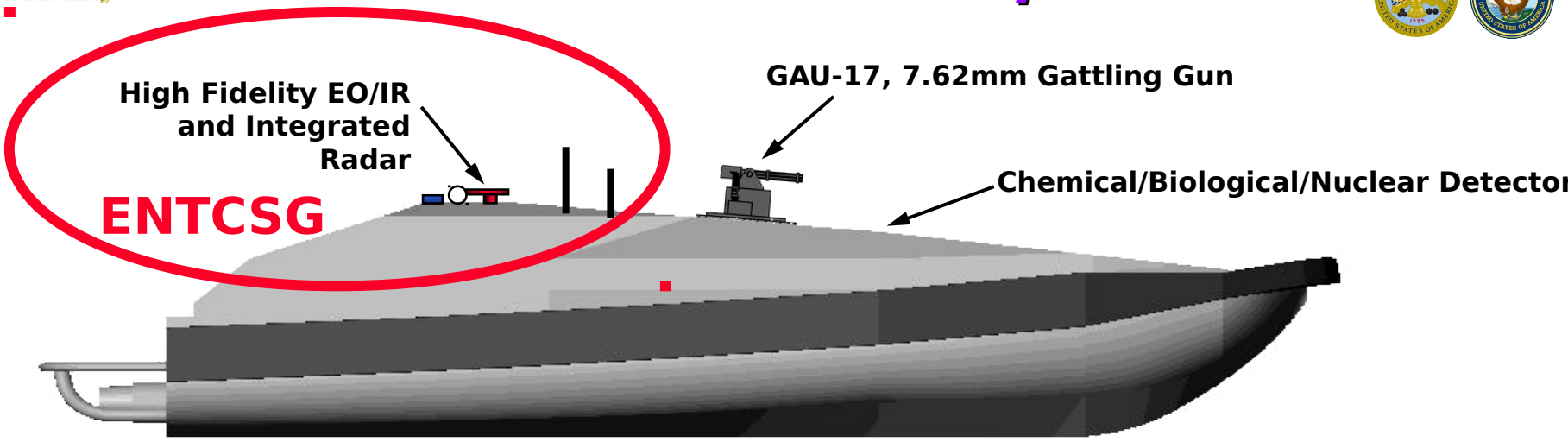


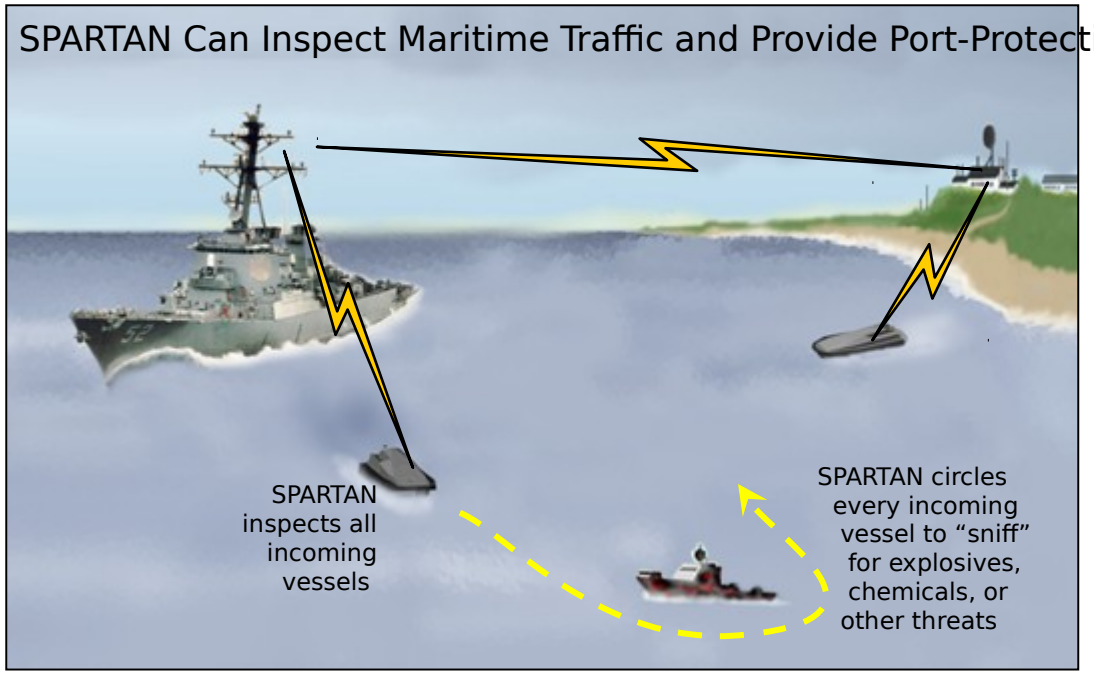
ACTD Reprioritization
Near-Term ENTCSG Support

- **SPARTAN ISR Prototype Requested by CCDG-12 to Support ENTCSG deployment**
  - Missions: Force Protection, Recognize Maritime Picture (RMP), Maritime Interdiction Operations (MIO), etc.
- **Reprioritization of ACTD from Spiral 1 MIW to Spiral 1 ISR deemed best course of action***
  - Original Schedule: MIW demo in Sept 03; ISR demo in Apr 04
- **Concurrence obtained from <u>all</u> ACTD sponsors**
- **Completed Phases 1, 2, & 3 in Mayport, FL**
- **SPARTAN Deployed with USS GETTYSBURG (CG-64)**
- **DUSD (AS&C) committed to Spartan success; additional $1M provided for ENTCSG**

*N763 memorandum for the record of 11 March 2003

SPARTAN SCOUT
ISR-FP Module Concepts

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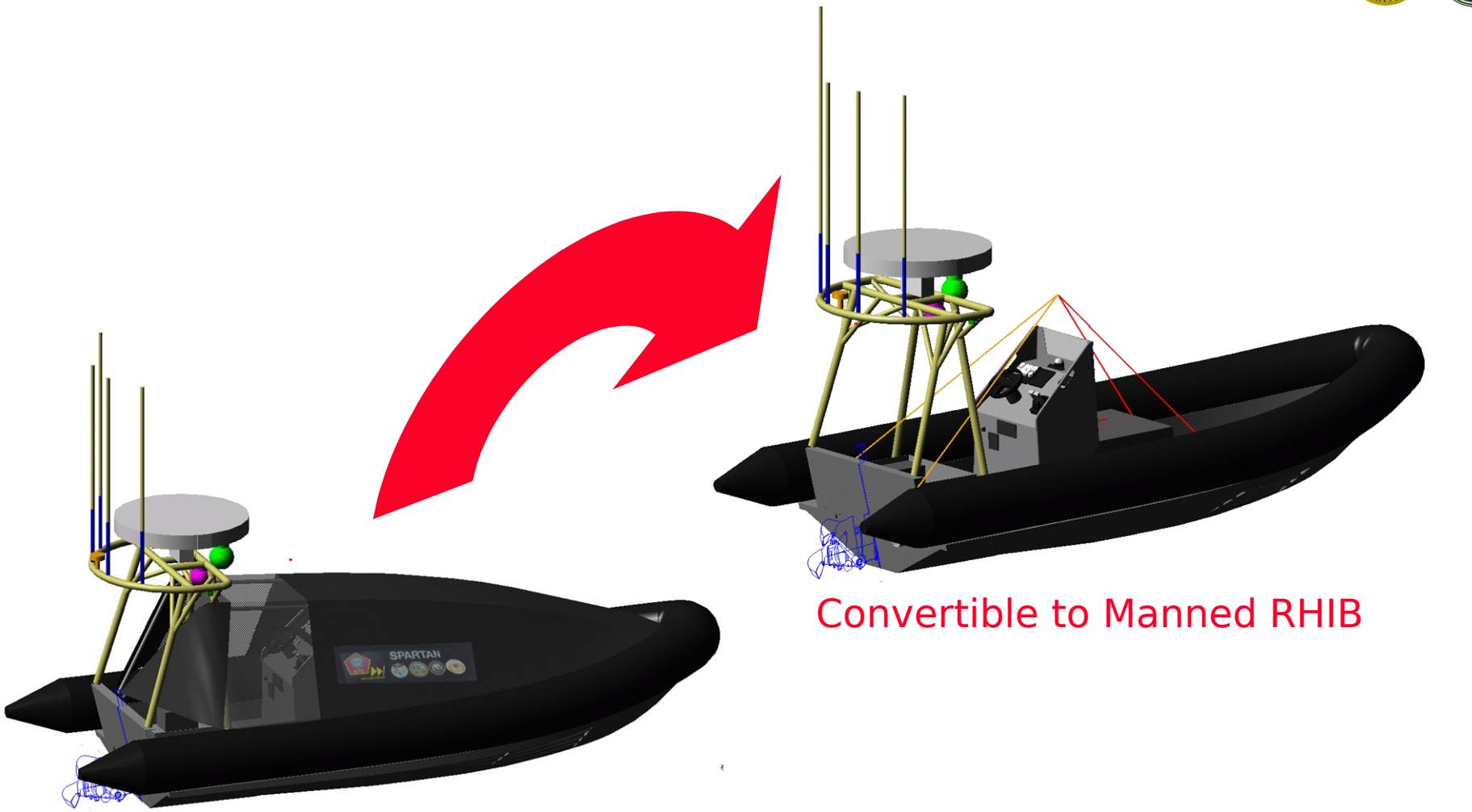
SPARTAN Dual Use

Convertible to support the Warfighter

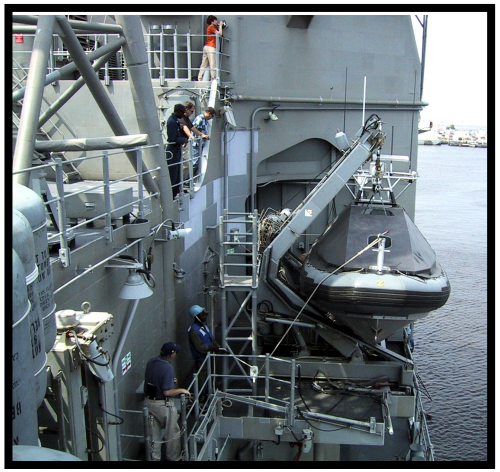


Convertible to Manned RHIB

Unmanned SPARTAN

SPARTAN with USS GETTYSBURG
Phase 1: Mayport, FL – 13 May 2003

Port Vest Davit



CIC Work Area

- C2, Video & ISR Laptops
- Video Monitors
- ISR Display
- Integrated Comms
- Video Recorders

ENTCSG Spartan ISR Capability

SPARTAN with USS GETTYSBURG Mayport, FL – 12 May 2003

SPARTAN with USS GETTYSBURG

Phase 2: Mayport, FL – 14-15 July 2003

SPARTAN Conducting Port/Harbor

SPARTAN Control Station in CIC

SPARTAN C2 Chart Display with Radar Overlay

SPARTAN EO Sensor Images of USS Kennedy in Heavy Rain

Preliminary Phase 2, 3 and 4 Feedback

- **Phase 2 Demonstrated**
  - Operation in inclement weather
  - Endurance in FP mode - 9 hours on station
  - Hailed “red” boat at 50 yards and issued Level 1 Warning
  - Conducted in-port L&R
- **Phase 3 Demonstrated**
  - Fuel contamination limited operations
  - ISR System check and operations conducted in davit
    - » Tracked ship with EO sensor from 3 nmi to 10 nmi
  - Limited EMI testing indicated raised no concerns
  - Conducted underway L&R up to SS 2+
- **Phase 4 Scheduled for October-December 03**
  - Completed Phase 4 and received SIPRNET report from USS GETTYSBURG
  - Five Unmanned Operations completed

SPARTAN "Scout" ACTD Summary
Army Perspective

- **Potential anti-access mitigation capabilities include, ISR, force protection, harbor security, bottom-mapping, and precision strike.**
- **Army has participated in development of ACTD Management Plan/draft CONOPS and will provide future support in the following areas:**
  - Provide a link to Army's concept, combat, and materiel developers.
  - Include SPARTAN capabilities in Army/Joint concepts, S&T initiatives, wargames, FOCs.
  - Facilitate integration of Army participation in applicable SPARTAN IPTs and workgroups.
  - Provide input to refined CONOPS based on Army mission areas for SPARTAN.
  - Integration of SPARTAN capability into Army Force Projection concepts, Force Operating Capabilities (FOC), port characterization requirements, maritime C2 (HCCC), etc.
- **Army Requirements:**
  - Deployment / employment considerations.
  - Command and Control.
  - Integrated Logistics Support (ILS).
  - Cost-benefit tradeoffs.
- **Near Term Schedule (2003):**
  - Operational Demonstration, Enterprise Battle Group (2nd Fleet), Jun 03-Present.
  - Develop Army FY05 STO ("Unmanned Maritime Surface Protection"), Jan 04.
  - Preliminary Design Reviews, Williamsburg, VA, 3-5 Feb 04.
  - Force Projection Symposium, Norfolk, VA, 18-20 May 04.
  - USARPAC operational demonstration with TSV, Fall 04.

SPARTAN USV Program
Summary

OBJECTIVE: Demonstrate the Military Utility of USVs for ASSURED ACCESS and FORCE PROTECTION in the Littorals and fill a void in capability that the Fleet is in critical need of today

- **Approved FY02 ACTD**
  - Started May 2002
  - Navy-led joint program
  - Coalition partner: Republic of Singapore
  - Warfighting Capability Demonstrations
    - »Force Protection
    - »Precision Strike/ASuW
    - »MIW
    - »C^2 of Multiple Spartans
    - »Bottom mapping (TBD)
  - ISR SPARTAN deployed ENTCSG
- **PRODUCT: A RHIB which can be deployed from Surface Ships and Shore-based Facilities which has:**
  - Unmanned, semi-autonomous operations
  - Existing systems and sensors
  - Modular warfighting capability
  - Cost effective force leveler/multiplier
- **Fleet Residuals [C3F]**
  - 3 Spartan Core Systems with 3 warfighting modules
    - »ISR/FP
    - »Precision Strike/ASuW
    - »MIW

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For Assured Access and Force Protection

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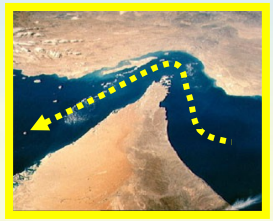
NAVAL UNDERSEA WARFARE CENTER DIVISION, NEWPORT, RI

SPARTAN Scout Army Concept of Operations (CONOPS)



UAV
Wide Area Ops/Comms

Force Protection
Harbor Security
Coastal Surveillance

USV
ISR / FP

USV
ISR/Force Protection

USV
Precision Strike

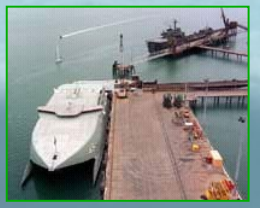
Strike

USV

Patrol Boats
With Weapons

USV
USW Mission

USV
Bathymetry Mapping



Austere Port &
Riverine
Operations

Intra-theater
Operational
Maneuver

Strategic
Sealift
Throughput

UUV
s

Acoustic
Homing
Torpedoes

Mines

Army Pursuing ISR/FP & Bathymetry Mapping Capabilities for Intra & Inter-Theater Sealift and Precision Strike Against Threat Targets